

Quantities

A quantity is anything that can be measured or counted.
A quantity is made up of a value and a unit.

Discrete Quantity: made up of pieces that can be counted.

e.g., Number of books on a bookshelf

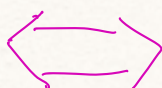
e.g., If I have 15 dimes, I have $15(\$0.10) = \1.50

Continuous Quantity: cannot be counted, but can be measured.

e.g., Cm of snowfall on Burnaby Mountain on a given day.

Polya's Problem Solving Technique

- ① Understand the problem
- ② Devise a Plan
- ③ Carry Out the Plan
- ④ Look Back



Quantitative Analysis

- ① List the quantities that are essential to the problem.
- ② List known values
- ③ Determine the relationships involved. *use diagrams, etc.
- ④ Use these relationships to solve the problem.
- ⑤ Does the solution make sense?

* It is important to be comfortable with multiple methods to * best support the learners who enter your classroom.

Some Methods

Strip Diagrams: Draw a different strip for each different quantity. Use your strips to compare the relationship between quantities. * Strip diagrams do NOT show scale *

- ① Work forwards to set up your strips
 - ② Then fill in the relating information, and
 - ③ work backwards to unravel the answer.

Guess & Check: use guesses to systematically get closer and closer to the solution. Guesses must be recorded along with rationale for changing direction.

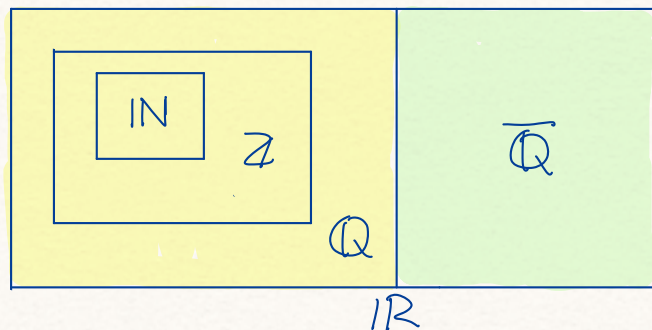
Tables are a great way to organize your guesses/reasons.

Algebra: Define a variable to represent the unknown quantities. Relate the variables to each other/known quantities. Now solve your equation(s).

* Use pictures/diagrams to help do this. *

The Set of Real Numbers

natural numbers $\mathbb{N} \rightarrow 1, 2, 3, 4, \dots$
 integers $\mathbb{Z} \rightarrow \dots, -2, -1, 0, 1, 2, \dots$
 rational numbers $\mathbb{Q} \rightarrow \frac{a}{b}, a, b \in \mathbb{Z}, b \neq 0$
 irrational numbers $\overline{\mathbb{Q}} \rightarrow$ not rational numbers
 real numbers $\mathbb{R} \rightarrow \mathbb{Q} \cup \overline{\mathbb{Q}}$



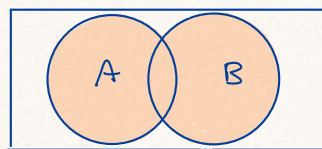
A number bag depicting the relationships between the real numbers. The diagram is called a Venn diagram.

Notation

* $\in$ means "is an element of"

* $\overline{\mathbb{Q}}$ means "not"

* $\cup$ means "union" of two sets. ie 1 is in $A \cup B$ if $1 \in A$, $1 \in B$, or both!



Venn diagram of $A \cup B$